



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

JAN 23 1995

Mr. Jack Ward Thomas, Chief
U.S. Department of Agriculture
Forest Service
Washington, D.C. 20090

Dear Mr. Thomas:

Enclosed is the biological opinion prepared by the National Marine Fisheries Service (NMFS) under section 7 of the Endangered Species Act on Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH).

As stated in the biological opinion, NMFS has determined that the proposed action is not likely to jeopardize the continued existence of endangered Snake River salmon species or result in the destruction or adverse modification of their designated critical habitat. In part, these conclusions were based on NMFS's expectation that the interim PACFISH guidance would be in place for a period not to exceed 18 months and that ongoing consultation on U.S. Forest Service Land and Resource Management Plans will be completed in a timely manner. Should this timeframe be exceeded, you should reinitiate consultation.

The Forest Service, Bureau of Land Management, and NMFS have worked together closely for more than 8 months at the staff level to make the interim PACFISH guidance clearer, more consistent, and to improve protective measures for listed salmon. Successful close coordination between our respective agencies through the PACFISH Implementation Team, during consultations on Forest Service Land and Resource Management Plans, and during project-specific consultations. In particular, I call your attention to the conservation recommendations contained in this biological opinion and urge you to implement these recommendations to the maximum extent practicable.

Sincerely,

Rolland A. Schmitten

Enclosure

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, MD 20910
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Mr. Mike Dombeck, Acting Director
U.S. Department of the Interior
Bureau of Land Management
Washington, D.C. 20240

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FOR FISHERIES



Endangered Species Act -
Section 7 Consultation

BIOLOGICAL OPINION

Implementation of Interim Strategies for
Managing Anadromous Fish-producing
Watersheds in Eastern Oregon and
Washington, Idaho, and Portions of
California (PACFISH)

Agency: U.S. Department of Agriculture, Forest Service and
U.S. Department of Interior, Bureau of Land Management

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Date Issued: 1/23/1995

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I. Organization of this Biological Opinion

This Opinion is organized according to the sections listed in the table of contents and described below. "Background" describes the consultation events leading up to the preparation of this opinion. "Proposed Action" describes the components of the proposed interim PACFISH guidance and explains how PACFISH would be implemented. In this Opinion, NMFS analyzed the proposed action (the PACFISH March 18, 1994 EA) as amended during consultation. "Consultation Approach" describes NMFS' approach to section 7 consultations on land management actions and their effects on listed Snake River salmon, in general, and to the PACFISH proposal in particular.

"Biological Information" gives an overview of the biology of the three endangered species of Snake River salmon, including historic (where estimable) and current run sizes, and a discussion of extinction risk. This section also includes a description of the environmental baseline (existing habitat conditions), and explains how the historic and existing land management regimes (to be altered by PACFISH) contributed to widespread degradation of this benchmark.

"Effects of the Proposed Action" describes how NMFS linked the programmatic decisions made using PACFISH to possible adverse effects on listed species and critical habitat, and to the possible taking of listed species.

II. Background

On April 1, 1994, the National Marine Fisheries Service (NMFS) received a March 18, 1994 biological assessment (BA) and environmental assessment (EA) on the Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California

(commonly referred to as the interim PACFISH strategy, or, in this document, as PACFISH). The BA concluded that PACFISH "may affect" listed species and designated critical habitat, but did not include a determination as to whether or the proposed action was "likely to adversely affect" or "not likely to adversely affect" listed species and designated critical habitat. NMFS staff met with staff of the Forest Service (FS) and Bureau of Land Management (BLM) (action agencies) on May 3, 1994 to discuss the PACFISH April 1, 1994 EA and Endangered Species Act (ESA) section 7 consultation. NMFS staff also met with the action agencies on July 12, July 20, August 16, and October 13, 1994 to discuss the PACFISH section 7 consultation.

During consultation, the action agencies made numerous changes to their original proposed action. These included clarifications of how the interim direction would be implemented and where key watersheds would be located initially, and numerous changes to the proposed standards and guidelines. This biological opinion (Opinion) analyzed the original proposed action, that is, alternative 4 from the March 18, 1994 PACFISH EA, as amended during consultation. The amendments are described in an October 11, 1994 letter from Gray F. Reynolds, FS, and Al Wright, BLM, to Rollie Schmitten, NMFS.

The objective of this Opinion is to determine whether the interim PACFISH strategy is likely to jeopardize the continued existence of Snake River sockeye salmon (*Oncorhynchus nerka*), Snake River spring/summer chinook salmon (*O. tshawytscha*), or Snake River fall chinook salmon (*O. tshawytscha*), or result in the destruction or adverse modification of their designated critical habitat.

III. Proposed Action

Unless stated otherwise, the source of all information in this biological opinion is the March 18, 1994 PACFISH EA, its attached BA, and the October 11, 1994 letter. The action agencies intend PACFISH to provide management direction {goals, riparian management objectives (RMOs), standards and guidelines (S&Gs), and procedures} that would arrest the degradation and begin the restoration of anadromous fish habitat on FS and Bureau of Land Management Lands in Eastern Oregon and Washington, Idaho, and portions of California. PACFISH would amend components of FS land and resource management plans (LRMPs) and BLM land use plans (LUPs) for each of the affected national forests and BLM districts on an interim basis while long-term management approaches are evaluated via geographically specific environmental impact statements (EISs).

The FS initiated consultation with NMFS on the LRMPs for the Umatilla and Wallowa-Whitman National Forests on August 3, 1994, and initiated consultation on the LRMPs for national forests in Idaho on September 12, 1994. The action agencies initiated the Oregon/Washington EIS in fall 1993, and will publish notices of intent to prepare EISs for Idaho and California published prior to or concurrent with issuance of the PACFISH EA finding (Harv Forsgren, FS, pers. comm. with Jeffrey Lockwood, NMFS, September 8, 1994). The FS and BLM expect all three EISs to have a Record of Decision within 18 months of PACFISH implementation (this was based on an expected release of PACFISH in mid-summer, which subsequently has been delayed).

The FS and BLM requested consultation on alternative 4 of the March 18, 1994 EA (the preferred alternative), which has been amended through consultation. Under alternative 4, the interim management direction would be applied to proposed actions as well as "high-priority" ongoing actions. On page 16 of the March 18, 1994 EA, high-priority, ongoing actions are defined as "those

determined, on a case-by-case basis, to pose unacceptable risk to habitat condition or at-risk anadromous fish." High-priority, ongoing actions would be reviewed to determine if they pose "unacceptable risk" to anadromous fish or their habitats. The text notes that FS Manual 2670 and BLM Manuals 6720 and 6840 "may be used to make the determination of unacceptable risk." During consultation, the action agencies and NMFS developed a draft definition of "unacceptable risk" (see the list of definitions at Appendix A) and a draft set of guidelines for determining whether ongoing actions posed an unacceptable risk (October 18, 1994 fax transmittal of September 2, 1994 draft from Harv Forsgren, FS to Jeff Lockwood, NMFS)

While PACFISH would amend components of existing LRMPs and LUPs, it purposely does not address the full range of landscape-scale decisions made by LRMPs and LUPs, such as land allocations. Those effects will be addressed through consultations at the LRMP and LUP levels of planning. Rather, PACFISH, as proposed, sets in place certain riparian management goals and management direction with the intent of arresting the degradation of riparian habitat.

A. The Components of PACFISH

The interim PACFISH strategy contains the following components: riparian goals, interim riparian management objectives (RMOs), riparian habitat conservation areas (RHCAs), standards and guidelines (S&Gs), key watersheds, watershed analysis, and watershed restoration.

Goals - The goals of PACFISH (March 18, 1994 EA p. C-4) are to "maintain or restore" characteristics of healthy, functioning watersheds, riparian areas, and fish habitat, and include elements such as water quality; stream channel integrity, channel processes and sediment regime; instream flows; water table

elevations; diversity and productivity of riparian vegetation; riparian vegetation functions such as large woody debris recruitment, thermal regulation, and bank stability; and riparian and stream habitats necessary to foster the genetically-unique fish stocks that have evolved within the geographic region.

Riparian Management Objectives - The interim RMOs provide a target for the outcome of land management actions. The action agencies used existing stream survey data to set interim RMOs for pool frequency, temperature, large woody debris, bank stability, lower bank angle, and width/depth ratio, as described in Appendix B, on an average basis for the entire range of PACFISH (including areas outside of the Snake River Basin). A watershed analysis (described as an optional process) could be used to replace the interim RMOs with RMOs that are specific to watersheds, streams or stream reaches; otherwise, the interim RMOs would apply.

Each of the interim RMOs must be met or exceeded before habitat would be considered "good" for anadromous fish. The March 18, 1994 EA explains the implications of "good" habitat only in the context of being a selection factor for key watersheds. Based on the March 18, 1994 EA, meetings with the action agencies, and the proposed definition for "attain RMO" (August 30, 1994 fax from Harv Forsgren, FS to Jeffrey Lockwood, NMFS; see Appendix A), NMFS understands the RMOs to be minimum targets for land managers. Thus areas where "good" habitat was surpassed would not be subjected to incremental degradation down to the level of "good". However, according to the March 18, 1994 EA, if the interim RMO for the only key element (pool frequency) is met or exceeded, some latitude would exist for meeting the other, supporting RMOs. No time frame for attaining the RMOs was described in the March 18, 1994 EA, nor was there any indication of the kinds, quality or duration of data needed to demonstrate that an RMO has been attained. However, the requirement developed during consultation that actions (with some exceptions; see discussion of standards and guidelines below) not retard or

prevent attainment of the RMOs sets an expectation of habitat recovery at natural rates or faster.

During consultation, the action agencies agreed to change the water temperature RMO (**October 11, 1994 letter**; see Appendix B of this opinion).

Riparian Habitat Conservation Areas - Interim RHCAs would be delineated in every anadromous fish-bearing watershed on lands administered by the FS and BLM. Interim RHCAs are areas where the PACFISH management direction automatically applies; however, they do not exclude management activity (including unscheduled timber harvest, livestock grazing, and mining). New road and landing construction (March 18, 1994 EA). Standard widths defining interim RHCAs are listed in Appendix A of this Opinion. The interim RHCAs are similar, but not identical to, the riparian reserves described in the Standards and Guidelines of the Record of Decision for Amendments to FS and BLM Planning Documents Within the Range of the Northern Spotted Owl (Alternative 9 Plan; U.S. Department of Agriculture and U.S. Department of the Interior 1994). Unlike the Alternative 9 Plan, the interim RHCAs for intermittent streams in PACFISH alternative 4 are reduced by one-half in non-key watersheds. The RHCAs for PACFISH alternative 4 stop at the edge of the 100-year floodplain (regardless of width) for non-forested rangeland ecosystems (the Alternative 9 plan did not specify different RHCAs for non-forested rangeland).

According to the March 18, 1994 EA, the interim RHCAs would apply until: a watershed analysis is completed; a site-specific analysis is conducted and described and the rationale for modification is presented; or the interim direction provided by PACFISH is terminated or superseded. During consultation, the FS and BLM agreed that new recreation facilities would be prohibited in interim RHCAs until after watershed analysis (October 11, 1994 letter).

Key Watersheds - According to the March 18, 1994 EA, the following criteria would be used to designate key watersheds following the implementation of PACFISH: (1) watersheds with stocks listed pursuant to the ESA or stocks identified as "at risk" by Nehlson et al. (1991); or, (2) watersheds that contain "excellent habitat" for mixed salmonid assemblages; or, (3) degraded watersheds with a high restoration potential. However, the action agencies informed NMFS during consultation that only watersheds with designated critical habitat for Snake River salmon would be designated as key watersheds (July 20, 1994 meeting and October 11, 1994 letter). The key watersheds would be subject to modification following issuance of the EISS for ecosystem management in eastern Oregon/Washington and Idaho.

During consultation, the action agencies agreed that BAs submitted after the date that PACFISH is implemented for actions in watersheds that do not contain critical habitat, but that serve as potential sources of high quality water to critical habitat (e.g. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam), shall provide the data (where available) and analysis needed to describe potential downstream effects on water quality (e.g. temperature, sediment load, and contaminants), and peak flow timing and volume within critical habitat (July 20, 1994 meeting). NMFS does not anticipate receiving many additional project-specific BAs for proposed actions, and does not anticipate receiving any project-specific BAs for ongoing actions, in the Clearwater River Basin during the period PACFISH is in effect.

The Clearwater National Forest (CNF) determined in 1992 BAs that all ongoing management actions, with the exception of wildfire suppression, in the Lolo Creek, Middle Fork Clearwater River, and Lochsa River watersheds had "no effect" on listed Snake River salmon. Since NMFS does not consult on "no effect" projects, NMFS assumes that these projects continued as proposed. This included some 480 projects in seven categories such as timber

harvest, road construction, and livestock grazing that are 50 to 150 miles above Snake River fall chinook salmon habitat (October 20, 1992 and December 17, 1992 letters from Win Green, CNF to Merritt Tuttle, NMFS). Since that time, the CNF has consulted with NMFS on a proposed cost-share road (Goat Roost Roads project) and on a proposed timber sale (Van Camp Sale) in the Lochsa River watershed (September 8, 1993 letter and BA from David Jolly, FS to Rolland Schmitten, NMFS).

The action agencies also agreed during consultation to coordinate with NMFS, through NMFS' representatives to the Columbia River Basin ecological assessment and EIS teams, on proposed and final designation of key watersheds for the Snake River Basin (July 20, 1994 meeting).

Watershed Analysis - Watershed analysis is described in the March 18, 1994 EA as "a systematic procedure for determining how a watershed functions in relation to its physical and biological components. This is accomplished through consideration of history, processes, landform, and condition." Watershed analysis as it is being developed pursuant to the Alternative 9 Plan emphasizes the importance of determining watershed status, resilience and capabilities, examining fish ecological relationships, and identifying watershed restoration and monitoring objectives, strategies, and priorities prior to planning actions in the watershed (Interagency Watershed Analysis Coordination Team 1994).

During consultation with NMFS, the action agencies indicated that watershed analysis procedures for the Snake River Basin would not be completely developed and tested during the period PACFISH is in effect (July 12 meeting). A limited number of watersheds (four to five) would be subject to prototype or pilot analyses during PACFISH (July 12 meeting and October 11, 1994 letter).

Watershed Restoration - Under Alternative 4, the action agencies assume that no additional funds will be available for watershed restoration during the interim period, but that existing funds will be re-targeted, "as necessary", to establish a watershed restoration program. Priority for restoration would be given to key watersheds. No further information was provided concerning the scope or timing of watershed restoration, although the March 18, 1994 EA ties restoration to priorities and strategies identified by watershed analysis.

Standards and Guidelines - The S&Gs address management of timber, roads, grazing, minerals, fire/fuels management, lands, riparian areas, watershed and habitat restoration, and fisheries and wildlife restoration. The S&Gs would apply only in the RHCAs.

The PACFISH S&Gs proposed in the March 18, 1994 EA would allow activities to proceed under a variety of scenarios: if there are no "impacts" or "adverse effects" that are "inconsistent with attainment of RMOs" (e.g. TM-1a, GM-1, LH-2, LH-3); "only when RMOs are not adversely affected" (e.g. TM-1b); or "in a manner that 'assures' (TM-1c) or is 'consistent with' attainment of the RMOs" (FW-2).

During consultation, the action agencies agreed to numerous changes in the S&Gs. These included three important changes that applied to essentially all of the S&Gs: (1) including consistent requirements that actions must not retard or prevent attainment of the RMOs (for certain existing facilities, the standard would be limited to not preventing attainment of the RMOs); (2) applying the S&Gs not only to the RHCAs, but to actions outside the RHCAs that could degrade the RHCAs (see list of definitions in Appendix A) (this decision would be made during the planning of individual actions); and (3) adding an emphasis on avoiding adverse effects to listed anadromous salmonid fishes and designated critical habitat, in addition to attaining the RMOs. The action agencies also agreed to: (1) prohibit sidecasting of

road material on road segments within or abutting RHCAs in watersheds containing designated critical habitat; (2) to prohibit storage of fuel and other toxicants in RHCAs; (3) to prohibit refueling within RHCAs; and (4) to add an S&G that directs the action agencies not to use mitigation or planned restoration as a substitute for preventing habitat degradation (October 11, 1994 letter).

B. The Implementation of PACFISH

The FS and BLM would apply PACFISH by means of different administrative procedures. For the BLM, provisions of existing LUPs (e.g. S&Gs and procedures) not in conformance with the proposed interim direction provided by PACFISH would be amended prior to implementation. For the FS, the proposed interim direction provided by PACFISH would be used to amend LRMPs for each of the affected national forests to include new S&Gs and "management direction". NMFS assumes this includes "procedures" as it would for the BLM.

IV. Consultation Approach

A. Determining Effects of Proposed Actions

The framework for evaluating actions affecting listed Snake River Salmon during Section 7 consultations is provided by Section 7(a)(2) of the ESA and the NMFS/Fish and Wildlife Service joint consultation regulations found at 50 CFR 402. For each listed species, NMFS uses the best scientific and technical data available to evaluate the current status of the species and its designated critical habitat, as well as the effects of the proposed action, which would be added, with any cumulative effects, to the existing environmental baseline. On the basis of this evaluation, NMFS determines whether the proposed actions are likely to jeopardize the continued existence of the listed

species or result in the destruction or adverse modification of the species' critical habitat.

NMFS is currently re-examining its approach for determining the particular requirements for each species' continued existence to address concerns raised in the recent court decision in the case of IDFG, et al. v. NMFS, et al., Civil No. 92-973-MA (D. Oregon, decided March 28, 1994). While this re-examination is under way, NMFS takes a conservative approach in reaching its ESA determinations and places particular emphasis upon the current risk of extinction faced by each species, and the likelihood of survival and recovery for each species. NMFS thinks that an objective of increasing the likelihood of both survival and recovery for each species, in this and all ESA consultations, will ensure that the effects of proposed actions will not likely jeopardize their continued existence.

NMFS examines the effects of a proposed action on the individual components of critical habitat (discussed in section IV) and determines whether those effects reduce the value of any essential feature of a habitat component. NMFS then considers the significance of a reduction in the habitat's value in relation to the species current status, risk of extinction, and the likelihood of both survival and recovery.

B. Rationale for this Opinion

The environmental baseline on lands managed by the action agencies in watersheds that may affect listed Snake River salmon and their critical habitat is degraded in most areas, and in further decline in many of those areas. Maintaining or worsening existing conditions would contribute to the continuing decline and possible extinction of the listed species. The existing management direction contained in the LRMPs and LUPs has contributed to these conditions. That direction is inadequate to arrest the accrual of adverse effects to listed species and

critical habitat, and, in some cases, exacerbates existing problems. The action agencies' stated purpose for PACFISH is to arrest the decline and begin the restoration of anadromous fish habitat beginning upon implementation and continuing until plans for ecosystem management are completed through the geographically-specific EISs.

The action agencies' ability to positively influence habitat conditions and processes through PACFISH is limited due to the interim nature of the proposed guidance and by information gaps that will persist, in some cases, until the EISs are drafted. Successful restoration of watersheds and concomitant improvements in fish habitat depend on a thorough understanding of watershed conditions, processes and capabilities, and of linkages between land management actions and effects to fish habitat. Procedures for addressing these issues are being developed by the interagency Watershed Analysis Coordination Team, the Columbia River Basin ecological assessment, the EIS teams, and FS research efforts partially funded by NMFS. Even if begun today, the most significant benefits of watershed restoration likely would not be realized except over a scale of decades to centuries. In consideration of these limitations, NMFS focused its analysis on PACFISH as a short-term strategy for maintaining future management options in RHCAs, rather than on the necessary additional components of a comprehensive approach to fish habitat that PACFISH is lacking. These additional components include but are not limited to the availability of habitat refugia for salmon subpopulations across the landscape, and an intensive and extensive watershed restoration program. NMFS will address these issues in more detail during the consultations on the LRMPs.

At the same time, however, NMFS thinks that PACFISH does not make all of the necessary interim corrections to existing LRMP/LUP guidance that are available to the action agencies, even within the information limits described above. To the extent that PACFISH would not change existing LRMP/LUP guidance to achieve

its stated purpose, it would allow certain existing management strategies to continue to lead to adverse effects to listed species and critical habitat. The difference between those harmful actions and management-related conditions that PACFISH effectively addresses and those that it leaves in place defines the adverse effects of PACFISH. The determinations made by NMFS regarding jeopardy and adverse modification of critical habitat by PACFISH (see Conclusions) are based on the significance of those adverse effects, within the reach of the action agencies considering the limitations described above, that the action agencies would allow to continue.

Under the ESA and its implementing regulations, and existing agency policies, agencies should avoid and minimize the incidental taking of listed species at their earliest opportunity. Therefore programmatic measures to avoid and reduce take are an appropriate result of a consultation on an action such as PACFISH. Consultations and further measures to address take will still be necessary at the LRMP/LUP and project/permit levels, where more detailed information about effects on listed salmon and critical habitat will be available.

V. Listed Species and Critical Habitat

There are three populations listed as endangered under the ESA that occur on Federal lands and may be affected by land management actions within the range of the draft EA: Snake River sockeye salmon (listed on November 20, 1991, 57 FR 58619); Snake River fall chinook salmon, and Snake River spring/summer chinook salmon (both were reclassified as endangered on August 18, 1994, 59 FR 42529). Endangered Sacramento River winter run chinook salmon (*O. tshawytscha*) do not occur on Federal lands addressed by the March 18, 1994 EA, but could be affected by FS or BLM land management actions in watersheds with tributaries to the Sacramento River. However, NMFS does not expect PACFISH to adversely affect Sacramento River winter run chinook salmon.

Critical habitat was designated for Snake River sockeye salmon, Snake River spring/summer chinook salmon, and Snake River fall chinook salmon on December 28, 1993 (58 FR 68543), effective on January 27, 1994. The designation of critical habitat provides notice to Federal agencies and the public that these areas and features are essential to the conservation of listed Snake River salmon.

Essential Snake River salmon habitat consists of four components: (1) Spawning and juvenile rearing areas, (2) juvenile migration corridors, (3) areas for growth and development to adulthood, and (4) adult migration corridors. Components 1, 2, and 4 are present within the range of PACFISH.

Essential features of the spawning and juvenile rearing areas for Snake River sockeye salmon include adequate: (1) Spawning gravel, (2) water quality, (3) water quantity, (4) water temperature, (5) food, (6) riparian vegetation, and (7) access.

Essential features of the spawning and juvenile rearing areas for Snake River spring/summer chinook salmon and Snake River fall chinook salmon include adequate: (1) Spawning gravel, (2) water quality, (3) water quantity, (4) water temperature, (5) cover/shelter, (6) food, (7) riparian vegetation, and (8) space.

Essential features of the juvenile migration corridors for Snake River sockeye salmon, Snake River spring/summer chinook salmon, and Snake River fall chinook salmon include adequate: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions.

Essential features of the Columbia River adult migration corridor for Snake River sockeye salmon, Snake River spring/summer chinook salmon, and Snake River fall chinook salmon include adequate:

(1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) riparian vegetation, (8) space, and (9) safe passage conditions.

VI. Biological Information

A. Snake River Sockeye Salmon

Snake River sockeye salmon adults enter the Columbia River primarily during June and July. Arrival at Redfish Lake, which now supports the only remaining run of Snake River sockeye salmon, peaks in August and spawning occurs primarily in October (Bjornn et al. 1968). Eggs hatch in the spring between 80 and 140 days after spawning. Fry remain in the gravel for three to five weeks, emerge in April through May and move immediately into the lake, where juveniles feed on plankton for one to three years before they migrate to the ocean (Bell 1986). Migrants leave Redfish Lake from late April through May (Bjornn et al. 1968), and smolts migrate almost 900 miles to the Pacific Ocean. For detailed information on the Snake River sockeye salmon, see Waples et al. (1991a) and 56 FR 58619 (November 20, 1991).

Downstream passage at Lower Granite Dam (the first dam on the Snake River downstream from the Salmon River) occurs from late April to July, with peak passage from May to late June (Fish Passage Center 1992). Once in the ocean, the smolts remain inshore or within the Columbia River influence during the early summer months. Later, they migrate through the northeast Pacific Ocean (Hart 1973, Hart and Dell 1986). Snake River sockeye salmon usually spend 2 to 3 years in the Pacific Ocean and return in their fourth or fifth year of life.

Historically, the largest numbers of Snake River sockeye salmon returned to headwaters of the Payette River, where 75,000 were taken one year by a single fishing operation in Big Payette Lake (Bevan et al. 1994). During the early 1880s, returns of Snake

River sockeye salmon to the headwaters of the Grande Ronde River in Oregon (Wallowa Lake) were estimated between 24,000 and 30,000 minimum (Cramer 1990, cited in Bevan et al. 1994). During the 1950s and 1960s, adult returns to Redfish Lake numbered more than 4,000 fish (Bevan et al. 1994).

Snake River sockeye salmon escapement to the Snake River has declined dramatically in recent years. Counts made at Lower Granite Dam since 1975 have ranged from 531 in 1976 to zero in 1990. In 1988, IDFG conducted spawning ground surveys that identified four adults and two redds (gravel nests in which the eggs are deposited). In 1989, one adult reached Redfish Lake and one redd and a second potential redd were identified. No redds or adults were identified in 1990. In 1991, three males and one female returned to Redfish Lake. One male Snake River sockeye salmon returned to Redfish Lake in 1992. Six male and two female Snake River sockeye salmon returned to Redfish Lake in 1993.

Since 1991, adults returning to Redfish Lake have been collected for the captive broodstock program. Therefore, only progeny of residual sockeye salmon (which NMFS has determined to be listed Snake River sockeye salmon [March 19, 1993, letter from N. Foster (NMFS) to constituents] are expected to migrate from Redfish Lake in 1994. Between 119 and 2550 juvenile Snake River sockeye salmon may be tagged with passive integrated transponders (PIT-tags) by the Idaho Department of Fish and Game and released into the Snake River system in 1994 (NMFS 1994a).

As of October 9, 1994, one adult sockeye salmon had returned to Redfish Lake in 1994. The Columbia River Technical Staffs (1993) predicted a return of three fish to the Columbia River mouth during 1994 based on the 1989-1993 average proportion of sockeye salmon counted at Ice Harbor and Priest Rapids dams. Dygert (1993) also estimated a return of three with an expected range from one to five Snake River sockeye salmon based on smolt counts and subsequent escapement to Redfish Lake. Numbers of returning

adults in 1997 and beyond may be higher as a result of captive rearing program releases planned for 1995 and 1996.

B. Snake River Spring/Summer Chinook Salmon

1. Life history summary

The present range of naturally-spawned-origin Snake River spring/summer chinook salmon is primarily limited to the Salmon, Grand Ronde, Imnaha, and Tucannon subbasins. Most Snake River spring/summer chinook salmon enter individual subbasins from May through September. Juvenile Snake River spring/summer chinook salmon emerge from spawning gravels from February through June (Perry and Bjornn 1991). Typically, after rearing in their nursery streams for about 1 year, smolts begin migrating seaward in April through May (Bugert et al. 1990, Cannamela 1992). After reaching the mouth of the Columbia River, spring/summer chinook salmon probably inhabit nearshore areas before beginning their northeast Pacific Ocean migration, which lasts 2 to 3 years. For detailed information on the life history and stock status of Snake River spring/summer chinook salmon, see Matthews and Waples (1991), NMFS (1991a), and 56 FR 29542 (June 27, 1991).

2. Population status and trends

The estimated number of wild adult Snake River spring/summer chinook salmon returning to spawn was estimated by Bevan et al. (1994) as more 1.5 million fish annually. By the 1950's the population had declined to an estimated 125,000 adults.

Escapement estimates indicate that the population continued to decline through the 1970's. Redd count data also show that the population continued to decline through about 1980. The estimated annual number of wild adult Snake River spring/summer chinook salmon returning over Lower Granite Dam (escapement) averaged 9,674 fish from 1980 through 1990, with a low count of 3,343 fish in 1980 and a high count of 21,870 fish in 1988

(Matthews and Waples 1991). Estimated escapement of wild adult Snake River spring/summer chinook salmon in 1991 and 1992 was 5,520 and 9,344 fish, respectively (1994-1998 biological assessment for the Federal Columbia River Power System (FCRPS)). In 1993, escapement of wild adult spring/summer chinook salmon was estimated at 7,803 fish (ESA section 10 permit application, Army Corps of Engineers, Juvenile Fish Transportation Program, November 15, 1993, revised December 7, 1993). Returns of spring/summer chinook salmon were at an all-time record low in 1994. Only 3,915 adults were counted at Lower Granite Dam; this is about 15% of the recent ten year average (Fish Passage Center 1994).

In small populations, random processes can lead to two major types of risk: demographic and genetic. Demographic risk is the risk of extinction due to environmental fluctuations, random events affecting individuals in the population, and possible reductions in reproduction or survival at low population sizes. Genetic risk is the risk of loss of genetic variability and/or population fitness through inbreeding and genetic drift. Both types of risk increase rapidly as population size decreases.

Severe, short-term genetic problems from inbreeding are unlikely unless population size remains very low for a number of years. However, the erosion of genetic variability due to low population size is cumulative, so long-term effects on the population (even if it subsequently recovers numerically) are also a concern.

The Snake River spring/summer chinook salmon evolutionarily significant unit consists of more than 30 local spawning populations spread over large geographic areas (Lichatowich et al. 1993). Therefore, the total number of fish returning to local spawning populations would be much less than the total run size. Assuming that 1,300 to 1,500 spring/summer chinook salmon adults survive to spawn, the average number of spawners per subpopulation would only be 30 to 40 fish (NMFS and USFWS 1994).

Based on recent trends in redd counts in major tributaries of the Snake River, NMFS believes that many local populations could be at critically low levels, with subpopulations in the Grande Ronde River, Middle Fork Salmon River, and Upper Salmon River basins at particularly high risk. Both demographic and genetic risks would be of concern for subpopulations, and in some cases, habitat might be so sparsely populated that adults would not find mates.

C. Snake River Fall Chinook Salmon

1. Life history summary

Adult Snake River fall chinook salmon enter the Columbia River in July and migrate into the Snake River from August through October. Natural spawning for Snake River fall chinook salmon is primarily limited to the Snake River below Hells Canyon Dam, and the lower reaches of the Clearwater, Grand Ronde, Imnaha, Salmon, and Tucannon Rivers. Fall chinook salmon generally spawn from October through November, and fry emerge from March through April. Downstream migration generally begins within several weeks of emergence (Becker 1970, Allen and Meekin 1973) with juveniles rearing in backwaters and shallow water areas through mid-summer prior to smolting and migration. The fish will spend 1 to 4 years in the Pacific Ocean before beginning their spawning migration. For detailed information on the life history and stock status of Snake River fall chinook salmon, see Waples et al. (1991b), NMFS (1991b) and 56 FR 29542 (June 27, 1991).

2. Population status and trends

Reliable historic estimates of abundance are unavailable for Snake River fall chinook salmon (Bevan et al. 1994). Estimated returns of Snake River fall chinook salmon declined from 72,000 annually between 1938 and 1949, to 29,000 from 1950 through 1959 (Bjornn and Horner 1980, cited in Bevan et al. 1994). Estimated returns of wild Snake River fall chinook salmon fell to a low of

78 fish in 1990, but since have increased to 318 in 1991, 533 in 1992 (WDF 1993), and 742 in 1993 (WDF 1994).

Based on the preliminary Columbia River run forecast, the estimated inter-dam adult fall chinook losses, and assuming no in-river harvest, the expected 1994 Snake River fall chinook salmon escapement to Lower Granite Dam ranges from 233 to 490 fish. **DON RECK AND/OR STEVE STONE WILL HELP US UPDATE.** Assuming an in-river harvest rate of 33 percent, the resulting expected escapement would be 236 fish (ranging from 156 to 328), the second lowest on record.

Although risks associated with small population sizes are also a general concern for Snake River fall chinook salmon, currently there is no evidence of multiple subpopulations of naturally-spawning Snake River fall chinook salmon. The anticipated short-term reduction in escapement during the next few years would not raise major genetic concerns of inbreeding, but certainly would raise demographic concerns. Genetic and demographic risks increase dramatically with increasing number of consecutive years of depressed populations.

D. Environmental Baseline

In large part, the sharp decline of salmon production in the draft EA region has resulted from a variety of activities that have degraded habitat, including hydropower development, water withdrawals, unscreened water diversions, road construction, timber harvest, livestock grazing, mining, and outdoor recreation. In general, land management actions that disturb ground and remove vegetation have: (1) reduced connectivity between streams, riparian areas, floodplains, and uplands; (2) drastically increased watershed sediment yields, leading to pool filling and elimination of spawning and rearing habitat; (3) reduced or eliminated recruitment of large woody debris that traps sediment, stabilizes stream banks, and helps form pools;

(4) reduced or eliminated the vegetative canopy that minimizes temperature fluctuations; (5) caused streams to become straighter, wider, and shallower, and in the worst case incised, with concomitant reduction in spawning and rearing habitat and increased thermal fluctuations; (6) altered peak flow volume and timing, leading to channel changes and probably altered fish migration timing; and (7) altered water tables and base flows, resulting in riparian wetland and stream dewatering (Eastside Forests Scientific Society Panel 1993; FEMAT 1993; McIntosh et al. 1994).

As stated on page 3 of the draft EA, "major portions of the lands administered by the FS and BLM have poor habitat conditions for anadromous fish, characterized by: 30-70 percent fewer large, deep pools; excessive fine sediments in spawning gravels; and greater disturbances of riparian vegetation than is acceptable." For example, streams in the Upper Grande Ronde River Basin have been heavily impacted by livestock grazing, road construction, timber harvest, mining, and stream channelization on private and Federal lands (McIntosh et al. 1994). Ten streams resurveyed in the Grande Ronde River Basin showed declines in the frequency of large pools by 20 - 90% over the period 1941 - 1990, with a total decline of 66% (McIntosh et al. 1994). Dominant substrate particle size generally decreased in the basin over the same period of time. Large woody debris was scarce in recent surveys of managed watersheds of the basin. Base stream flows nearly doubled from 1904 to 1990 in the Upper Grande Ronde River, and increased by 25% during the same period in Catherine Creek, and peak flows had shifted to as much as 30 days earlier in the spring.

Similar kinds of habitat damage are widely distributed throughout managed watersheds in the Columbia River Basin studied by McIntosh et al. (1994). The historic and existing management regimes on FS and BLM lands have fostered and allowed this habitat degradation to occur by not adequately providing for the

needs of salmon and their habitats during the planning and execution of land management actions and during land allocation planning. Principal among the ways in which the historic and existing land management regimes have contributed to the decline of salmon habitat are: (1) historic overemphasis on production of non-fishery commodities at the expense of riparian and fish habitat; (2) failure to take a biologically conservative or risk-averse approach to planning land management actions when inadequate information exists about the relationship between land management actions and fish habitat; (3) failure to incorporate known scientific information into the planning of actions; (4) planning actions on a site-specific basis, rather than based on watershed and river basin conditions and capabilities; and (5) reduction in the number, size and distribution of remaining high-quality habitat areas (such as roadless and lightly developed areas) that could serve as refugia for salmon subpopulations and recolonization loci.

VII. Effects of the Proposed Action

PACFISH does not authorize ground-disturbing actions. However, it does amend riparian area management provisions of USFS LRMPs and BLM land use plans, which do authorize actions, and it also sets in place riparian management objectives (RMOs), riparian habitat conservation areas (RHCAs), and standards and guidelines (S&Gs) for activities in RHCAs, and for actions outside RHCAs that pose an "unacceptable risk" or that would degrade the RHCAs (see definitions in Appendix A). PACFISH thereby would affect the extent and effects of future project-scale activities in RHCAs, and would do the same for some actions outside of RHCAs. Some of these actions inside and outside of RHCAs likely would not be subject to section 7 consultation because they may be considered by forest managers to have "no effect" on listed species or critical habitat, even though their cumulative impacts could adversely affect listed species or critical habitat. The adverse effects of PACFISH include any of these adverse cumulative impacts that the interim guidance does not eliminate.

There are effects at the broad scale of PACFISH that are not likely to be addressed in project-specific consultations, but that could result in adverse effects to listed species. An example of such an effect is the combined effects of Federal actions on salmon subpopulations that may be distributed across more than one watershed (currently, section 7 consultations for land management actions are being carried out one watershed at a time, and sometimes by subwatershed or individual project. The effects of PACFISH also include process-related issues such as: the consistency of the application of standards and guidelines and other salmon protection measures, across watersheds and administrative boundaries, by the action agencies; the consistency of determinations as to whether particular actions assist, retard, or prevent the attainment of RMOs, or adversely affect listed species; the designation and implications of key

watersheds; the quality, timing and consistency of watershed analysis; and the quality and consistency of the scientific information used to modify RHCAs. The effects of PACFISH are limited somewhat by the interim nature of the proposed guidance. NMFS expects that PACFISH will be in place for 12 to 15 months beyond its implementation date.

A. Effects on Listed Species

PACFISH will exert its effects on listed species mainly indirectly through its potential effects on designated critical habitat. Changes in designated critical habitat that can be attributed to PACFISH may have negative, neutral or positive effects on salmon survival and recovery potential, as described in section VI.B. below. The effects of PACFISH will be most noticeable on Snake River spring/summer chinook salmon, since their spawning and rearing habitat is mainly located in upper river reaches and tributaries in which habitat quality is closely linked to land management actions. The migratory habitat of Snake River spring/summer chinook salmon also may be affected by PACFISH. PACFISH also may affect the spawning and migratory habitat of Snake River fall chinook salmon, although to a lesser extent than for Snake River spring/summer chinook salmon, since these fish spawn in mainstem rivers. The migratory habitat of Snake River sockeye salmon could be affected by PACFISH.

B. Effects on Designated Critical Habitat

The indirect effects of PACFISH on the essential features of designated critical habitat are described below. In summary, implementation of PACFISH may impact critical spawning, rearing, and migratory habitat for Snake River spring/summer chinook salmon and Snake River fall chinook salmon, and migratory habitat for Snake River sockeye salmon, indirectly through its influence over how actions are planned and carried out in the Snake River Basin.

1. Application of PACFISH to Ongoing Actions

In current ongoing consultations, there are some classes of ongoing actions that the FS and BLM may not be treating consistently for effects determinations at the project-specific level. This can lead to inconsistent application of protection measures for listed salmon and designated critical habitat. For example, under existing guidance on effects determinations, road maintenance may be considered "no effect" by one forest manager but "may affect" by another, even under similar conditions with similar risks to listed species. Under PACFISH alternative 4, management direction would be applied to proposed actions as well as "high-priority" ongoing actions. High-priority, ongoing actions are described in the March 18, 1994 EA as "those determined, on a case-by-case basis, to pose unacceptable risk to habitat condition or at-risk anadromous fish." The text notes that FS Manual 2670 and BLM Manuals 6720 and 6840 "may be used to make the determination of unacceptable risk".

The draft PACFISH EA did not provide sufficient explanation about what constitutes "unacceptable risk," or how it would be determined. NMFS' experience with reviewing biological assessments under the ESA indicates that FS and BLM land managers exercise wide latitude in making effects determinations under existing guidance. Therefore, continued use of the current guidance regime under PACFISH likely would have allowed some harmful ongoing actions to proceed, such as the majority of livestock grazing actions and numerous ongoing mining actions.

The screening process for "unacceptable risk" ongoing actions developed by the action agencies and NMFS during consultation should identify most of the ongoing actions that are likely to adversely affect listed salmon or designated critical habitat. Some adverse effects could accrue during the lag time between PACFISH implementation and completion of the screens, from ongoing actions that pass through the screens prior to completion

of consultation with NMFS, and from the cumulative impacts of "no effect" actions that are not subjected to the screens. The effectiveness of the screens for identifying actions that are likely to adversely affect listed salmon and their designated critical habitat will depend on how consistently they are applied.

2. Riparian Management Objectives

The RMOs provide a consistent set of targets for riparian areas and fish habitat. In most managed watersheds, the current habitat conditions likely are worse than the RMOs. This implies that actions that would degrade existing conditions should not be undertaken, and PACFISH likely will have this positive effect in some areas. However, PACFISH provides FS and BLM land managers broad leeway in deciding whether planned or ongoing actions will assist, retard or prevent attainment of RMOs.

PACFISH, as amended during consultation, allows potentially harmful land use activities such as livestock grazing or prescribed burning to proceed in RHCAs if land managers determine they will not retard or prevent attainment of the RMOs, or adversely affect listed species. PACFISH allows mining to proceed within RHCAs if a reclamation plan and bond are prepared, regardless of whether the mine would retard or prevent RMOs or adversely affect listed species. Depending on existing habitat conditions, the location of salmon habitat, the nature, magnitude and duration of the action, and other factors, such actions may adversely affect listed species and their designated critical habitat by increasing sediment loads and raising water temperatures (grazing, prescribed burning and mining) or contaminating streams with heavy metals (mining). PACFISH does not provide a decision framework for determining whether or not such land use activities will assist, retard or prevent attainment of the RMOs. This issue likely will be addressed by an interagency PACFISH Implementation Team that will include

representation by NMFS staff (October 13, 1994 meeting). Although PACFISH does not include specific timeframes for attainment of the RMOs, NMFS assumes that the requirement developed during consultation that actions not retard attainment of the RMOs is equivalent to a requirement that actions should not impede natural habitat recovery rates.

PACFISH does not address the amount, quality, or timeframe of data necessary to determine whether RMOs are being met prior to management actions being taken that could alter the key or supporting features. This complex problem is being addressed through the ongoing consultations on LRMPs and LUPs and through the site-specific consultations.

The draft EA does not include scientific documentation that supports the setting of the RMOs at the given levels and the ability of the one key and five supporting features to serve as adequate surrogates for all other stream and riparian habitat factors that can affect the growth, survival, and reproductive success of anadromous salmonids. Fine substrate sediment in spawning and rearing areas is an example of a habitat feature not included in the RMOs that can significantly affect salmon survival and recovery. Although pool frequency (included as an RMO) is sensitive to sediment loads, its response time likely is too slow to be of much value in identifying actions, conditions, and processes that are responsible for elevating sediment delivery to levels that could adversely affect listed species and designated critical habitat. NMFS and the action agencies are addressing the evaluation and monitoring of fine sediment in the ongoing consultations on the LRMPs and LUPs.

The draft EA did not clearly instruct managers to prevent degradation of areas that currently surpass the minimum requirements of the broad regional criteria set by the RMOs. The amended PACFISH guidance will include a definition of "attain RMOs" (July 12, 1994 meeting and August 30, 1994 fax from Harv

Forsgren, FS to Jeff Lockwood, NMFS) that includes an element of maintaining conditions that are better than the RMOs, and specifies that "actions that would degrade the RMOs are inconsistent with the concept of attaining RMOs." This "antidegradation clause" should reduce the potential for damage to the riparian features from land management decisions, relative to the March 18, 1994 PACFISH EA, although the guidance is somewhat indirect as a result of being part of the definitions.

PACFISH allows RMOs to be adjusted based on watershed analysis or site-specific analysis. Without watershed analysis, adjustment of RMOs to less optimum conditions could adversely affect designated critical habitat, although NMFS would be able to review actions in areas with modified RMOs during watershed-scale, project-specific consultations. PACFISH does not provide guidance for areas where existing data indicates that watershed or stream reach habitat capabilities surpass the RMOs. Thus PACFISH would not prohibit management practices that maintain conditions that meet or surpass the RMOs but are below watershed or reach capability, possibly placing a cap on egg to smolt survival. Due to its interim nature and the lack of a significant restoration component, PACFISH will not be able to overcome this problem in many areas where habitat is degraded, regardless of whether decisions are made in a biologically conservative manner.

Actions allowed to proceed under the PACFISH guidance that remove vegetation or disturb soils in areas originally designated as RHCAs, such as logging and yarding (Chamberlain et al. 1991) following site-specific adjustment of RHCAs, livestock grazing (Clary and Webster 1989, Platts 1991, Burton et al. 1993), and mining (Nelson et al. 1991) could adversely affect salmon and their habitat in a variety of ways. Salvage logging, fuelwood cutting, or other actions that remove trees adjacent to streams would reduce inputs of large fallen wood into stream channels and

onto adjacent banks. Large pieces of wood stabilize stream banks and adjacent hill slopes, capture and store fine sediment, and increase the volume (Carlson et al. 1990) and diversity of pool habitat that is crucial to survival of juvenile salmonids (Bisson et al. 1987, Hicks et al. 1991a).

Ground disturbance within or outside of RHCAs (caused by timber yarding, mining, livestock grazing, or recreation activities) could increase surface erosion and raise watershed fine sediment yield. Intact RHCAs would, in most instances, buffer streams from sediment carried in unchannelized flows, but may not effectively protect streams from sediment carried in channelized flows (Belt et al. 1992). Laboratory and field studies summarized by Chapman and McLeod (1987) and Hicks et al. (1991a) demonstrated that for a variety of salmonids, including chinook salmon, increasing proportions of fine sediment (variously defined as particles that would pass sieve openings from 0.83 mm to 9.5 mm in size) reduced fish survival from egg to emergence of fry, and caused earlier emergence of surviving fry. Smaller fry could be expected to suffer higher mortality rates.

Adult salmon remove some fine sediment and organic material from spawning gravel when they construct redds (Bjornn and Reiser 1991). However, fine sediments deposited within or on top of redds after spawning can reduce survival by lowering interstitial water flow and oxygen concentrations, and by physically preventing live fry from emerging from the gravel (USDA 1982; Chapman and McLeod 1987; Hicks et al. 1991a). Salmonid embryos may be most sensitive to fine sediment deposition early in the incubation period, because young embryos take up oxygen less efficiently than advanced embryos (Bjornn and Reiser 1991).

Accumulations of fine sediment can reduce pool volume (Chamberlin et al. 1991) or eliminate small pockets of habitat between rocks (USDA 1982a), thereby reducing feeding, resting, and overwintering areas for juvenile salmon. Densities of benthic

macroinvertebrates may be lowered by accumulation of fine sediment, possibly reducing the food supply for salmonids (Gregory et al. 1987).

The reduction or elimination of the vegetative canopy over streams can reduce winter water temperatures by increasing heat loss via evaporation, convection, and long-wave radiation. This can slow salmon egg development and increase instream ice development, destabilizing stream banks (Beschta et al. 1987, Chamberlin et al. 1991). Shade reductions also can raise summer water temperatures, and thereby delay spawning migrations, reduce survival of eggs and juveniles, suppress or eliminate growth of juveniles, and alter juvenile migration timing (Beschta et al. 1987, Chamberlin et al. 1991, Hicks et al. 1991a). Studies summarized by Armour (1991) indicate that the upper lethal temperature limit for juvenile chinook salmon is approximately 77°F, adverse growth suppression begins to occur at approximately 59°F, and growth ceases at approximately 66°F. Temperatures less than 61°F are required for successful spawning migrations, spawning, and incubation (Armour 1991).

NEED TO ADDRESS SOCKEYE ADULT MIGRATION

The PACFISH water temperature RMOs, as amended by the October 11, 1994 letter (see Appendix B), are adequate to support salmon spawning and rearing, where RMOs are attained. However, the RMOs leave little room for unforeseen events or conditions that could raise water temperatures. The amended temperature RMO of 64 F in rearing and migratory habitat is set at a level where sublethal stress to juvenile spring/summer chinook salmon and migrating adult spring/summer chinook salmon is possible (Armour 1991). However, in many, if not most, watersheds containing designated critical habitat, water temperatures currently exceed the RMOs. Because the RMO does not accommodate any temperature increases from FS or BLM land management actions in watersheds with designated critical habitat, the RMO should guide land managers to avoid further reductions in stream shade. Also, the general

S&G requirement that most kinds of actions do not retard attainment of the RMOs should help restore the conditions and processes needed begin the reduction of water temperatures where they are too warm.

Mining can significantly degrade salmon habitat and water quality. Mining activities can raise sediment loads by an order of magnitude, destabilize streambanks, reroute streams, and alter peak stream flows (Nelson et al. 1991). Acid waste from mines may be directly lethal to salmon, or can mobilize potentially toxic heavy metals such as arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, and zinc (Nelson et al. 1991).

In forest openings created by logging, mining, and other actions that remove the forest canopy within or outside of RHCAs, the combination of more precipitation reaching the ground, rain-on-snow events, and less evapotranspiration of water by trees can combine to significantly increase soil moisture and water yield relative to undisturbed areas (Chamberlin et al. 1991, Grant 1986, Hicks et al. 1991b, Nelson et al. 1991, Satterlund and Adams 1992). Greater water inputs from created openings into streams can increase the volume of peak flows and the frequency of channel-modifying flows. These events can increase bed scour and accelerate bank erosion, resulting in higher stream sediment load and lower habitat diversity (Chamberlin et al. 1991), and may disturb or destroy redds (USDA 1982, Bjornn and Reiser 1991). Livestock grazing can lower water tables and cause channels to become incised (Clary and Webster 1989).

PACFISH would only apply to actions outside of RHCAs if forest managers decide that those actions pose an unacceptable risk (for ongoing actions) or if they decide those actions would degrade the RHCAs. Thus the ability of PACFISH to control adverse effects from actions outside RHCAs depends on whether it is implemented in a consistently risk-averse and biologically

conservative manner. NMFS is addressing the full range of potential actions outside of RHCAs in ongoing consultations on the LRMPs and LUPs, and in site-specific consultations.

3. Watershed Analysis

The Forest Ecosystem Management Assessment Team (FEMAT, 1993) and the President's Forest Plan (U.S. Department of Agriculture and U.S. Department of the Interior 1994, Appendix A) described watershed analysis as a set of procedures that would examine watershed status, resilience and capabilities as a basis for planning land management actions, monitoring and restoration. Although the PACFISH S&Gs do represent a significant improvement over existing planning practices, PACFISH would not require decisions about individual projects to be based on a comprehensive understanding of watersheds, and therefore may not eliminate all adverse effects to listed salmon arising from continuance of existing planning practices guided by the LRMPs/LUPs. The action agencies do not expect watershed analysis procedures for use in the range of PACFISH to be fully developed and field-tested during the period the interim PACFISH strategy is in effect. NMFS and the action agencies will further address the relationship between watershed analysis and proposed actions in current and upcoming consultations on LRMPs and LUPs.

4. Riparian Habitat Conservation Areas (RHCAs)

The proposed RHCAs provide a consistent starting point for addressing riparian and aquatic habitat concerns. For the most part, the RHCAs are similar to or larger than the areas commonly subject to special management consideration as riparian areas in many of the biological assessments previously submitted to NMFS for consultation in the Snake River basin. However, this has not been consistent across administrative boundaries or action categories. For example, some national forests have used riparian buffers similar to the RHCAs for timber sales, but have

not specified how riparian areas subject to different livestock management are defined, or have used a definition that is more or less restrictive than PACFISH. By improving consistency in addressing riparian and aquatic habitats, the proposed RHCAs should help reduce adverse effects to listed species from future activities in many instances, relative to what would have occurred by following the existing guidance. Although designation of RHCAs in and of itself will not restore habitat that already is degraded, the designation will foster the beginning of natural habitat restoration.

However, the proposed RHCAs may not be adequate to protect fish habitats in all cases. The proposed RHCA for fish-bearing and permanently flowing non fish-bearing streams may not adequately protect meandering, low-gradient, permanently flowing streams with floodplains wider than 600 feet. This would include some areas of high historic productivity for salmon, such as Bear Valley in Idaho. Under PACFISH, potentially harmful activities such as road construction or mining could be allowed up to the edge of the floodplain and not subject to PACFISH. This could result in increased sedimentation or other impacts to the floodplain, and hence the stream during floods or when the stream changes its course within the floodplain. NMFS is addressing this problem in site-specific consultations.

The proposed RHCAs stop at the edge of the 100-year floodplain (regardless of width) in non-forested rangeland ecosystems. This may not provide adequate protection from land management actions for streams with narrow floodplains. NMFS is addressing this problem in site-specific consultations.

The proposed RHCAs reduce protection for intermittent streams by half in non-key watersheds. Insufficient riparian protection in intermittent streams can lead to increased sediment export downstream, water temperature alterations, and reduced availability of organic materials including leaf litter and large

wood for export downstream. The action agencies have not analyzed potential downstream effects of reduced protection for intermittent streams in the Clearwater River Basin that are outside of designated critical habitat. Because of the reduced RHCA size in non-key watersheds, management activities along intermittent streams in the Clearwater River Basin could result in water temperature alterations or sediment depositions in the critical habitat of Snake River fall chinook salmon in the mainstem Clearwater River. Higher stream temperatures in the Clearwater River could alter the timing of adult and juvenile salmon migrations to less than optimum (Anonymous 1994). Reduced water temperatures in the Clearwater River during winter are of particular concern for fall chinook salmon due to the possibility of delayed fry emergence (Arnsberg et. al 1992). The problem of reduced winter water temperatures is due in part to past forest management practices in the Clearwater National Forest that removed riparian vegetation and in part to water management at Dworshak Dam. Because of the great distances involved between designated critical habitat and the affected streams, NMFS is uncertain whether measurable downstream effects will occur from reduced intermittent stream protection. However, there likely is some incremental risk to listed Snake River fall chinook salmon from land management actions by the action agencies. NMFS and the action agencies will further address the suitability of limiting key watersheds to those watersheds with designated critical habitat in ongoing and upcoming consultations on LRMPs and LUPs (October 13, 1994 meeting).

As proposed in the draft EA, the RHCAs would be subject to modification following watershed analysis or "site-specific analysis" Although watershed analysis goals are given in the draft EA, procedures for watershed analysis are not identified. Also, goals and procedures are not given for the alternative "site-specific analysis". NMFS is concerned that site-specific analyses, by definition, would not include watershed-scale factors that should affect the final form of the RHCAs. Also,

without scientifically valid guidance on procedures, the analyses used to adjust RHCAs likely will vary in uniformity and quality. This will result in uneven protection for listed species and designated critical habitat, with adverse effects resulting in some instances.

Overall, the RHCAs likely will reduce future degradation of riparian areas and fish habitat, relative to what would have occurred without the PACFISH guidance, and will allow restoration of these areas to begin. However, adjustment of the RHCAs without watershed analysis could allow some adverse effects to accrue. Also, NMFS and the action agencies do not expect significant riparian restoration to occur during the relatively short period of time the interim PACFISH is in effect.

Even though the RHCAs in key watersheds are significantly larger than traditional riparian buffer areas used by the action agencies, their effectiveness in protecting fish habitat is somewhat uncertain for some of the reasons described above, and because of the importance of site-specific factors such as slope, soil types, vegetative cover, and hillslope stability (Belt et al. 1992, FEMAT 1993). Implementation, effectiveness and validation monitoring and research are needed to determine the effectiveness of the RHCAs in maintaining stream and riparian ecosystem functions and fish production.

5. Key Watersheds

The action agencies' decision to modify the original proposal regarding the designation of key watersheds as contained in the draft EA, so that only watersheds with designated critical habitat are included in the initial designation may have implications for Snake River fall chinook salmon in the lower mainstem Clearwater River. See the discussion of the Clearwater River under Riparian Habitat Conservation Areas, above. NMFS also recognizes that this decision could affect other species

currently undergoing status review for listing, such as steelhead, although this concern is beyond the scope of this biological opinion (for more information, see NMFS [1994c]).

6. Roadless Areas

According to FEMAT (1993) and the Eastside Forests Scientific Society Panel (1993), road construction has been a primary cause of salmonid habitat decline. FEMAT (1993) summarized Furniss et al. (1991) as follows:

Roads may have unavoidable effects on streams, no matter how well they are located, designed or maintained... Roads modify natural hillslope drainage networks and accelerate erosion processes. These changes can alter physical processes in streams, leading to changes in streamflow regimes, sediment transport and storage, channel bank and bed configurations, substrate composition, and stability of slopes adjacent to streams. These changes can have significant biological consequences that affect virtually all components of stream ecosystems.

Roadless areas contain much of the remaining high-quality habitat for anadromous fish. They can be considered havens for weak stocks and may facilitate the future recolonization of restored habitats (FEMAT 1993, Eastside Forests Scientific Society Panel 1993). Consideration of land allocations, including roadless areas, was a crucial factor in estimating salmonid population viability under different alternatives in the final supplemental EIS for managing Federal lands in the range of the northern spotted owl (James Sedell, Principal Research Ecologist, FS, Pacific Northwest Research Station, pers. comm. with Jeffrey Lockwood, NMFS).

PACFISH would not prohibit construction of new roads in inventoried roadless areas of key watersheds or require a reduction in total road mileage in key watersheds. Some protection for these areas will be afforded by the requirement to complete watershed analysis prior to constructing roads in RHCAs. In many watersheds, this will preclude construction of valley bottom or mid-slope roads until watershed analysis procedures are developed, tested, and finalized, since stream (RHCA) crossings generally would be required.

The March 18, 1994 EA described an alternative (alternative F) that would have prohibited construction of new roads in roadless areas. However, the March 18, 1994 EA states that this provision would not have made a substantial difference, because, among other factors, current management direction requires a project-level analysis of any entry into roadless areas that could extend beyond the interim period covered by PACFISH. However, this approach does not offer protection against harmful effects of road construction in roadless watershed areas for two reasons: 1) some projects already have undergone project-level analysis without the benefit of the guidance provided by PACFISH. For example, NMFS currently is involved with several ESA section 7 consultations in the Snake River Basin that include proposals to build roads in roadless watershed areas; and 2) project-level analysis is not the appropriate analytical scale for investigating watershed or landscape-scale questions such as those involving anadromous fish habitat and risks to fish at the population or subpopulation scale.

NMFS believes that a strategy for identifying and protecting remaining areas of high quality salmon habitat at the landscape scale is crucial to the survival and recovery of listed salmon. However, during consultation, the action agencies informed NMFS that analysis of habitat refugia is beyond the scope of PACFISH. NMFS will limit this consultation to the proposed scope of PACFISH, that is, a riparian management strategy. NMFS and the

action agencies will address roadless areas in site-specific consultations, and also will address land allocations in the ongoing consultations on LRMPs and LUPs.

7. Watershed Restoration

NMFS does not expect PACFISH to significantly alter the amount or kinds of watershed restoration actions carried out during the interim period it is in effect. Thus it will be difficult for the action agencies to achieve part of their stated purpose (begin the restoration of anadromous fish habitat) and to improve the already-deteriorated environmental baseline. However, watershed restoration may be more effective and cost-efficient following watershed analysis (FEMAT 1993). Also, designation of RHCAs will allow natural restoration to begin in areas where further damage from mining or grazing is prevented. Due to the lack of significant watershed restoration during the interim period from PACFISH, and because of the degraded condition of critical habitat in many areas, it is especially important that PACFISH avoid and minimize adverse effects to listed species and designated critical habitat.

8. Standards and Guidelines (S&Gs)

The S&Gs in the March 18, 1994 EA were not consistent, as they would allow activities to proceed under a variety of scenarios: if there are no "impacts" or "adverse effects" that are "inconsistent with attainment of RMOs" (e.g. TM-1a, GM-1, LH-2, LH-3); "only when RMOs are not adversely affected" (e.g. TM-1b); or "in a manner that 'assures' (TM-1c) or is 'consistent with' attainment of the RMOs" (FW-2).¹ The amended S&Gs (described generally in the October 11, 1994 letter and specifically in an

¹ These abbreviations are explained as follows: GM for grazing management, RM for recreation management, MM for minerals management, LH for lands management, TM for timber management, and FW for fisheries and wildlife restoration.

August 30, 1994 fax from Harv Forsgren, FS to Jeffrey Lockwood, NMFS) specify consistently (with the exception of proposed mining activity) that actions that would retard or prevent attainment of the RMOs, or that adversely affect listed species, should be modified or eliminated.

Because of the reliance on RMOs, most of the S&Gs proposed in the draft EA were inadequate to minimize adverse effects to listed salmon and critical habitat. Most of the RMOs (with the exception of water temperature, lower bank angle, and streambank stability) are features that change only gradually. Reliance on these objectives means that some short-term adverse effects to listed species and critical habitat could be overlooked. For example, there is no provision in the draft EA that addressed direct damage to salmon redds from in-stream trampling by cattle, and no RMO for fine sediment in spawning and rearing habitat.

Following are comments on S&Gs as amended during consultation. The following abbreviations apply: TM, timber management; MM, management; and FM, fire/fuels management.

MM-1. This guideline addresses mine reclamation requirements "for impacts that cannot be avoided" in RHCAs, but does not clearly instruct managers to avoid impacts from mining. In effect, it allows future mining activity in RHCAs so long as reclamation bonds and plans are prepared.

MM-1, MM-2, MM-3. No guidance is provided on how forest managers should decide whether "impacts (from mineral operations)... cannot be avoided" (MM-1), "no alternative to siting facilities in RHCAs exists" (MM-2) and "no alternative to locating mine waste... facilities in RHCAs exists".

TM-1a. Under the proposed guidance, salvage logging and fuelwood cutting is permitted in RHCAs if it will not retard or prevent attainment of RMOs (October 11, 1994 letter). These actions pose

risks of reduced shade, altered water temperatures, reduced inputs of large woody debris, and increased sedimentation. In watersheds with designated critical habitat, salvage logging and fuelwood cutting should be prohibited in RHCAs except where watershed analysis indicates these actions may be required to attain the RMOs (this approach would be consistent with the President's Forest Plan). During consultation, the action agencies agreed that timber removal in RHCAs would not be permitted until after watershed analysis. However, following watershed analysis, timber removal would be permitted in RHCAs where the action agencies decide the action would not retard or prevent attainment of the RMOs (October 13, 1994 meeting). This could allow some incremental risk to listed salmon and designated critical habitat, particularly where watershed conditions or capabilities are demonstrated by watershed analysis to exceed (in a positive sense) the RMOs.

Roads Management: Under the March 18, 1994 EA and the October 11, 1994 letter, PACFISH only would apply to ongoing road management activities if they posed an "unacceptable risk". NMFS believes that, because of the difficulty of sorting out the accumulated effects of individual roads on watersheds, roads in watersheds that may affect listed salmon should be consistently managed to avoid adverse effects and attain the RMOs. The PACFISH S&Gs for roads management, as amended during consultation, are a reasonable approach to this problem and should be implemented in all "may affect" watersheds.

Guideline RF-3b was changed during consultation from a directive to meet RMOs by "closing and stabilizing, or obliterating and stabilizing roads not needed for future management activities" to "prioritizing closing and stabilizing, or obliterating and stabilizing roads not needed for future management activities." Although the intent of the action agencies to prioritize these actions is apparent, the guideline should be changed to

reemphasize the need to carry out these actions, not merely prioritize them.

Fire/fuels Management: These guidelines are a reasonable starting point for wildfire suppression activities. However, the guidelines would allow prescribed burning and "fuels management" to occur within or outside RHCAs if they do not prevent attainment of the RMOS. Because of inherent risks of excessive vegetation removal, sedimentation, and escaped fires, it may be prudent to limit these actions within RHCAs to situations where they are needed to attain RMOS, and then only after watershed analysis.

C. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For the purposes of this analysis, the action area includes all USFS and BLM lands in all watersheds that contain designated critical habitat for listed Snake River salmon, or that do not contain designated critical habitat but in which land management actions are subject to section 7 consultation for "may affect" actions (this has at times included portions of the Clearwater River basin excluding the North Fork Clearwater River above Dworshak Dam.

In the Snake River Basin, non-Federal lands have been subjected to as great or greater degradation of fish habitat than Federal lands. Although no information on non-Federal lands was provided in the PACFISH BA, it is apparent that most of the remaining high-quality fish habitat is on Federal lands since non-Federal lands generally are less remote, more accessible, and subject to a somewhat larger array of stressors than Federal lands. However, a substantial portion of historic salmon spawning and

rearing habitat does occur on non-Federal lands. Many of these areas have been degraded by the effects of agriculture, water withdrawals and diversions, urbanization, riparian road building, logging, and livestock grazing. This has resulted in loss of riparian vegetation, increased water temperature, increased nutrient loading, loss of pools, and increased fine sediment (for an example of stream conditions on non-Federal land see the discussion of the Tucannon River in USDA 1982a and Theurer et al. 1985). These impacts have substantially reduced survival for Snake River spring/summer chinook salmon in many watersheds, and for Snake River fall chinook salmon in some river reaches.

To some extent, the protective measures included in PACFISH may reduce the availability of Federal timber, rangeland, mineral and recreational resources to local user groups. The draft EA predicted cancellation of some timber sales within the Clearwater and Nez Perce National Forests and in the BLM Cour d'Alene District due to restrictions in PACFISH. The draft EA also predicted a reduction in livestock grazing in RHCAs of affected areas. Depending on other economic factors that are impossible to predict within the scope of this Opinion, these restrictions could lead to increased resource use on non-Federal lands with accompanying damage to riparian and fishery habitats. However, there is inadequate information to determine whether these changes to non-Federal actions are reasonably certain to occur.

D. Summary of Effects

The PACFISH RMOs provide a generic set of habitat standards that, if attained through use of the proposed S&Gs, would represent an improvement over current conditions in many managed watersheds. Some of the RMOs, particularly temperature and bank stability, likely are set at levels that represent less optimal conditions than what is naturally attainable in many watersheds containing designated critical habitat. In the areas where existing habitat is better than the RMOs, PACFISH would not explicitly prohibit

management actions that would reduce habitat conditions to the level of the RMOs (relying instead on indirect guidance through the definition of "attain RMOS"). This situation probably is less common than the situation where existing conditions are worse than the RMOs. In those situations, managing so as not to retard or prevent attainment of the RMOs should reduce or eliminate most adverse effects of ongoing and proposed actions to listed species and designated critical habitat. However, PACFISH does leave some room for interpretation as to how actions will affect attainment of the RMOs and how they will affect listed salmon and their designated critical habitat. PACFISH thereby reduces, but fails to eliminate the same problem in the existing guidance of the LRMPs/LUPs, and may allow some adverse effects to listed salmon and designated critical habitat to accrue.

PACFISH does not explicitly protect roadless areas and other areas of remaining high quality salmon habitat. However, the requirement to complete watershed analysis prior to constructing roads in RHCAs should result in fewer and less-damaging roads in RHCAs.

The proposed PACFISH interim direction would only apply to designated RHCAs whose borders are defined by relatively local geomorphic factors. Having a consistent starting point for riparian area management should help reduce adverse effects to listed species and designated critical habitat by increasing protection of riparian areas (this is dependent on how the standards and guidelines are applied) and by improving consultation consistency. However, PACFISH would only apply to actions outside of RHCAs if forest managers decide that those actions pose an unacceptable risk (for ongoing actions) or if they decide those actions would degrade the RHCAs. The possibility that upland activities outside the RHCAs will not be consistently managed under PACFISH, due to the discretion afforded individual forest managers, may lead to further degradation of spawning and rearing habitats in some areas due to

watershed-scale effects. Thus PACFISH would incompletely correct existing problems with the LRMP/LUP approaches, and would allow some adverse effects to listed species and designated critical habitat to accrue.

The effectiveness of the PACFISH S&Gs in avoiding and minimizing adverse effects to listed species and critical habitat will vary depending on the extent to which they are applied to ongoing actions (and therefore on the consistency of "unacceptable risk" determinations), and on whether RMOs currently are attained in the area in which the S&Gs are being applied.

VIII. Conclusion

NMFS has determined that, based on the available information, the PACFISH interim strategy is not likely to jeopardize the continued existence of Snake River sockeye salmon, Snake River spring/summer chinook salmon, or Snake River fall chinook salmon, or result in the destruction or adverse modification of critical habitat. In general, the implementation of PACFISH should avoid and reduce degradation of designated critical habitat, and prevent increases in habitat-related salmon mortality, from most ongoing and future land management actions during the interim period, particularly with regard to timber harvest, road construction, and road maintenance, relative to what would have occurred without PACFISH. The effectiveness of PACFISH in controlling ongoing and future habitat degradation from livestock grazing and mining is less certain.

Implementation of PACFISH could foster the beginning of natural habitat restoration in some areas of designated critical habitat. However, since PACFISH will be in place for a relatively short time, and does not contain an active watershed restoration component, it is unlikely that its implementation will significantly reduce mortality of listed salmon caused by

existing degradation of the environmental baseline. Possible cumulative effects from PACFISH are difficult to predict but are not likely to be significant.

Under the ESA and its implementing regulations, and existing agency policies, agencies must avoid or minimize incidental take at their earliest opportunity. Therefore programmatic measures to reduce take are an appropriate result of a consultation on an action such as PACFISH. Consultations and further measures to address incidental take will still be necessary at the LRMP/LUP and project/permit levels, where more detailed information about effects on listed salmon and designated critical habitat will be available.

IX. Reinitiation of Consultation

Consultation must be reinitiated if: the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action, as described in the March 18, 1994 EA and amended by the October 11, 1994 letter is modified in a way that causes an effect on listed species or critical habitat that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

X. Conservation Recommendations

Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, to develop additional information, or to assist the Federal agencies in complying with their obligations under section 7(a)(1) of the ESA. NMFS believes the following conservation recommendations are consistent with these

obligations, and therefore should be implemented by the FS and BLM:

- 1) The FS and BLM should issue a directive that proposed mineral exploration and extraction actions in RHCAs of watersheds with designated critical habitat constitute significant impacts that will require environmental impact statements and watershed analysis prior to implementation.
- 2) The FS and BLM should begin using the watershed analysis procedures developed for the Alternative 9 Forest Plan by the Watershed Analysis Coordination Team as soon as they are amended and released (expected in March 1995).
- 3) The FS and BLM should begin identifying areas that are in obvious need of watershed restoration immediately upon implementation of PACFISH, and should begin planning for and carrying out watershed restoration in those areas as soon as possible. Priorities should be based on existing and potential risks and effects to listed salmon and their critical habitat, as well as the likely effectiveness of the restoration effort.
- 4) The FS and BLM should require completion of Road Management Plans and Transportation Management Plans within 18 months of the implementation of PACFISH.
- 5) Prescribed burning and fuels management actions inside RHCAs should be limited to situations where they are needed to attain RMOS, and should only be planned and implemented following watershed analysis.
- 6) Until final key watersheds are identified through the Columbia River Basin ecological assessment and designated in the eastern Oregon/Washington and Idaho environmental impact statements (EISs) for ecosystem management, the FS and BLM should designate as interim key watersheds those watersheds that contain

salmonids proposed for listing or watersheds containing proposed critical habitat as key watersheds.

7) The FS and BLM should include watersheds that may affect the temperature of waters in designated critical habitat (i.e. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam) in areas subject to the interim RHCAs described on p. C-7 of the March 18, 1994 PACFISH EA.

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XII. Appendix A

INTERIM RIPARIAN MANAGEMENT OBJECTIVES AND RIPARIAN HABITAT CONSERVATION AREAS FINAL PROPOSAL IDENTIFIED BY USFS AND BLM DURING SECTION 7 CONSULTATION ON INTERIM PACFISH DIRECTION

INTERIM RIPARIAN MANAGEMENT OBJECTIVES

Interim Objectives	Habitat Feature
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Pool Frequency (key factor)

Varies by channel width, see below:
(all systems)
wetted width in feet: 10 20 25 50 75 100 125 150 200
number pools per mile: 96 56 47 26 23 18 14 12 9

Water Temperature

No measurable increase in maximum water temperature* to result from Federal land management activities.

Management activities will contribute to decrease maximum water temperatures below 64 F within migration and rearing habitats, and below 60 F within spawning habitats.

*Maximum water temperature is defined as the 7-day moving average of daily maximum temperature. (This will be measured as the average of the maximum daily temperature of the warmest consecutive 7-day period).

Large Woody Debris (sf)	Coastal California, Oregon, and Washington.
(forested systems)	>80 pieces per mile; >24 inch diameter; >50
	foot length.

East of Cascade Crest in Oregon, Washington, Idaho. >20 pieces per mile; >12 inch diameter; >35 foot length.

Bank Stability (sf)	>80 percent stable.
(non-forested systems)	

Lower Bank Angle (sf)	>75 percent of banks with >90 degree angle
(non-forested systems)	(i.e. undercut).

Width/Depth Ratio (sf) <10, mean wetted width divided by mean depth
(all systems)

RIPARIAN HABITAT CONSERVATION AREAS (RHCAs)

The interim RHCA widths would apply until (1) Watershed Analysis is completed, (2) a site-specific analysis is conducted and described and the rationale for modification of interim RHCA boundaries is presented, or (3) the termination of the interim direction.

STANDARD WIDTHS DEFINING INTERIM RHCAs

Four categories of stream or water body, and the standard widths for each are:

Category 1 - **Fish-bearing streams:** Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.

Category 2 - **Permanently flowing non-fish-bearing streams:** Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year flood plain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.

Category 3 - **Ponds, lakes, reservoirs, and wetlands greater than 1 acre:** Interim RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.

Category 4 - **Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas:** This category includes features with high variability

in size and site-specific characteristics. At a minimum the interim RHCAs must include:

- a. the extent of landslides and landslide-prone areas,
- b. the intermittent stream channel and the area to the top of the inner gorge,
- c. the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation, and
- d. for Key Watersheds, the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest;
- e. for watersheds not identified as Key Watersheds, the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greatest.

In non-forested rangeland ecosystems, the interim RHCA width for permanently flowing streams in category 1 and 2 is the extent of the 100 year flood plain.

XIII. Appendix B.

FINAL DEFINITIONS PROPOSED BY USFS AND BLM DURING SECTION 7 CONSULTATION ON INTERIM PACFISH DIRECTION

Adverse Effects: Adverse effects include short or long-term, direct or indirect management-related, impacts of an individual or cumulative nature, such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproductive success, delayed or premature migration, or other adverse behavioral changes to listed anadromous salmonids at any life stage. Adverse effects to designated critical habitat include effects to any of the essential features of critical habitat (e.g., as described at 58 FR 68543) that would diminish the value of the habitat for the survival and recovery of listed anadromous salmonids.

Adverse Impacts: As used to define unacceptable risk, the term refers to management-related, short or long-term, direct or indirect impacts of an individual or cumulative nature that jeopardize the viability of, or which may cause a non-listed anadromous salmonid population to become threatened or endangered.

Attain RMOs: Meet riparian management objectives for the given attributes. For habitats below the objective level, recovery will be initiated during the period the interim strategy is in place. For habitats at or better than the objective level, maintain at least the current condition. Actions that "degrade" habitat conditions (as defined elsewhere) would be considered inconsistent with the concept of attaining RMOs.

Avoid to the Greatest Extent Practicable/Possible: Apply pre-protect planning, best available technology, management practices, and scientific knowledge to eliminate known management induced impacts and minimize the risk of potential impacts.

Best Conventional: Most effective existing techniques, methods and/or management practices.

Degrade: Measurably change an RMO feature in a way that:

- further reduces habitat quality, where existing conditions meet or are worse than the objective values.
- reduces habitat quality, where existing conditions are better than the objective values.

Designated Critical Habitat: Those habitats designated by the National Marine Fisheries Service or US Fish and Wildlife Service, under provisions of the Endangered Species Act, that include (1) the specific areas within the geographical area

occupied by a Federally listed species on which are found physical or biological features essential to the conservation of the species, and that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a listed species, upon determination by the Secretary of Commerce or Interior that such areas are essential for the conservation of the species.

Fish-bearing Streams: Stream segments that support fish during all or a portion of a typical year.

High-water Quality: Water with the physical, biological and chemical attributes necessary to meet the life-history requirements and provide for the naturally-attainable productivity of anadromous salmonids.

Minimize: Apply pre-protect planning, best available technology, management practices, and scientific knowledge to reduce the magnitude, extent and/or duration of impacts.

Non-Forested Rangelands: Land on which the native vegetation is predominately grasses, grass-like plants, forbs, or shrubs. In determining what minimum interim RHCA boundary widths apply, there may be instances where the widths for non-forested rangelands apply to one side of a stream and the widths for forested lands apply to the other side of the stream (based on the vegetative cover of adjacent uplands).

Ongoing Actions: Those actions that have been implemented, or have contracts awarded, or permits issued and (within the range of listed anadromous salmonids) for which BA's have been prepared and submitted for consultation, prior to signature of the decision notice for the proposed action (PACFISH Interim Direction).

Permanently Flowing, Non-Fish-bearing Streams: Stream segments that contain running water throughout a typical year, but do not support fish during any portion of a typical year.

Prevent Attainment of RMOs: Preclude attainment of habitat conditions that meet RMOs. Permanent or long-term modification of the physical/biological processes or conditions that determine the RMO features would be considered to prevent attainment of RMOs.

Proposed or New Actions: Those actions that have not been implemented, or for which contracts have not been awarded, or for which permits have not been issued, or (within the range of listed anadromous salmonids) continuing actions for which BA's have not been prepared and submitted for consultation, prior to signature of the decision notice for the proposed action (PACFISH Interim Direction).

Retard Attainment of RMOs: Measurably slow recovery of any identified RMO feature (e.g., pool frequency, water temperature, etc.) that is worse than the objective level. Measurable degradation of the physical/biological process or conditions that determine RMO features would be considered to retard attainment of RMOs.

Short-Term Habitat Impacts: Impacts of a short duration - generally days or weeks - that would not retard or prevent attainment of RMOs.

Unacceptable Risk: A level of risk from an ongoing activity or group of ongoing activities that is determined through NEPA analysis, and/or through the preparation or subsequent review of biological assessments/evaluations to be:

- "likely to adversely affect" listed anadromous salmonids or their designated critical habitat or
- "likely to adversely impact" the viability of non-listed anadromous salmonids.

XIV. Incidental Take Statement

Section 9 and regulations implementing Section 4 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. When a proposed Federal action is found to be consistent with Section 7(a)(2) of the ESA (i.e., the action is found not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat) and that action may incidentally take individuals of listed species, NMFS will issue an incidental take statement specifying the impact of any incidental taking of endangered or threatened species.

The incidental take statement also provides reasonable and prudent measures that are necessary to minimize impacts, and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures. Incidental takings resulting from the agency action, including incidental takings caused by activities authorized by the agency, are exempted from the taking prohibition by section 7(o) of the ESA, but only if those takings are in compliance with the specified terms and conditions. In setting forth these terms and conditions, NMFS assumes that the interim PACFISH will be implemented in accordance with the final guidance contained in the October 11, 1994 from Gray F. Reynolds, FS, and Al Wright, BLM, to Rollie Schmitten, NMFS. NMFS further assumes that the interim PACFISH guidance will be in effect for no more than 12 to 15 months beyond its implementation date.

NMFS believes that although implementation of interim PACFISH direction will likely reduce future degradation of habitat for listed Snake River salmon over existing conditions, moderate levels of incidental takings will still occur through habitat degradation permitted under the proposed guidance. PACFISH

allows certain potentially harmful land use activities, such as livestock grazing to proceed in RHCAs if the action is predicted to not retard or prevent attainment of the RMOs, or to adversely affect listed species. Yet, PACFISH does not provide a decision framework for determining whether or not such land use activities will assist, retard, or prevent attainment of the RMOs, or describe the data requirements needed to reach a decision that the RMOs have been attained. PACFISH allows mining to proceed within RMOs if a reclamation plan and bond are prepared, regardless of whether the mine would retard or prevent RMOs or adversely affect listed species.

Additional take may result during the lag time between PACFISH implementation and completion of the screens for ongoing actions, and possibly from certain ongoing actions that pass through the screens, prior to completion of consultation with NMFS.

The proposed riparian habitat conservation areas (RHCAs) may not provide complete protection for listed salmon in streams with narrow floodplains in non-forested rangeland ecosystems. For salmon in streams with floodplains wider than 600 feet, the RHCAs may not provide complete protection from upland activities because PACFISH would not apply to activities on the upland side of the 100-year floodplain. PACFISH may not provide complete protection to listed fall chinook salmon and designated critical habitat of Snake River fall chinook salmon in the mainstem Clearwater River because of reduced protection for intermittent streams in non-key watersheds.

Watershed analysis is not required prior to planning and carrying out most new actions under PACFISH (with the exception of new recreation facilities, and salvage logging or fuelwood cutting in RHCAs). Take may result from carrying out actions that do not fully take into account watershed status, resilience and capabilities. The RHCAs would be subject to modification following watershed analysis or site-specific analysis. Goals

and procedures are not given for the alternative "site-specific analysis", and site-specific analyses, by definition, would not include watershed-scale factors that should affect the final dimensions of the RHCAs. Without scientifically valid guidance on procedures, the analyses used to adjust RHCAs are likely to vary widely in quality, with take possibly resulting from actions in adjusted RHCAs.

As proposed, PACFISH does not include specific management direction and S&Gs for upland areas. PACFISH would only apply to areas outside the RHCAs if forest managers decide ongoing actions pose an unacceptable risk, or if they believe proposed actions would degrade the RHCAs. Failure to consistently control effects of upland activities outside the RHCAs that may affect riparian and stream conditions indirectly means the interim PACFISH does not fully protect listed species and does not eliminate the potential for take. Based on the PACFISH features and consequences described above, NMFS qualitatively estimates the level of take of from PACFISH implementation as moderate for Snake River spring/summer chinook salmon, low for Snake River fall chinook salmon, and negligible for Snake River sockeye salmon during the period the interim guidance is in effect.

A. Reasonable and Prudent Measures

The following reasonable and prudent measures are provided to minimize and reduce the anticipated level of incidental take associated with _the interim PACFISH guidance:

1. Contribute to the protection of and reduce risks to remaining high-quality salmon habitat within the Snake River Basin by analyzing the effects, on a landscape scale, of the transportation system on listed species prior to completing or implementing road construction projects in roadless areas 1000

acres in size or greater during the period that PACFISH is in effect.

2. Identify and designate a system of key watersheds that will: protect remaining high-quality habitat for listed salmon, and areas that can be restored to high quality habitat; provide a network of havens for subpopulations of listed salmon across the Snake River Basin; facilitate the future recolonization of restored habitats; and protect sources of high quality water for designated critical habitat for Snake River salmon.

3. Design and implement watershed analysis: to determine watershed status, resilience and capabilities; examine fish ecological relationships; establish watershed-specific boundaries for Riparian Habitat Conservation Areas and Riparian Management Objectives; and identify watershed restoration and monitoring objectives, strategies, and priorities.

4. Implement interim Riparian Management Objectives (RMOs) that will guide land managers to protect and restore habitat conditions that are required by all life stages of listed salmon. For water temperature, implement the RMO identified in the **October 11, 1994 letter**.

5. Delineate interim Riparian Habitat Conservation Areas (RHCAs) that will protect and restore ecological structures, functions, and processes in riparian areas, maintain ecologically important linkages between upslope areas, riparian areas, and streams, and promote the survival and recovery of listed salmon.

6. Monitor and report on the implementation of PACFISH interim direction and on actions planned under the interim direction.

To carry out these reasonable and prudent measures, the following terms and conditions shall be implemented by the Forest Service, the Bureau of Land Management, and their contractors:

B. Terms and Conditions

1. Contribute to the protection of and reduce risks to remaining high-quality salmon habitat within the Snake River Basin by analyzing the effects, on a landscape scale, of the transportation system on listed species prior to completing or implementing road construction projects in roadless areas 1000 acres or greater in size during the period that PACFISH is in effect.

a. The FS and BLM, in coordination with the Columbia River Basin (CRB) assessment team, shall provide to NMFS following the issuance of this biological opinion the following information: (1) a map of inventoried roadless areas in the Snake River Basin; (2) descriptions of the roadless areas including names, locations, sizes and general geomorphological descriptions of these areas; (3) a description of any planned road construction in these areas during the period PACFISH will be in effect; (4) additional road construction likely to be proposed during the period PACFISH will be in effect; and (5) an analysis of the impacts of the proposed road system on remaining salmon habitat

b. The FS and BLM shall use the information provided in 1(a) in evaluating potential impacts of road construction during consultations on ongoing or proposed actions that include any road construction in roadless areas 1000 acres or greater in size.

2. Identify and designate a system of key watersheds that will: protect remaining high-quality habitat for listed salmon, and areas that can be restored to high quality habitat; provide a network of havens for subpopulations of listed salmon across the Snake River Basin; facilitate the future recolonization of

restored habitats; and protect sources of high quality water for designated critical habitat.

a. Biological assessments submitted by the FS or BLM to NMFS after the date that PACFISH is implemented for actions in watersheds that do not contain critical habitat, but that serve as potential sources of high quality water to critical habitat (i.e. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam), shall provide the data (where available) and analysis needed to describe potential downstream effects on water quality (e.g. temperature, sediment load, and contaminants), and peak flow timing and volume within critical habitat.

c. The FS and BLM shall coordinate with NMFS, through NMFS' representatives to the CRB assessment and EIS teams, on proposed and final designation of key watersheds for the Snake River Basin.

d. The FS and BLM shall, in coordination with NMFS, analyze and report to NMFS on the need to designate additional key watersheds within 3 months of the listing of additional anadromous fish species under the ESA during the period the interim PACFISH guidance is in effect.

3. Design and implement watershed analysis: to determine watershed status, resilience and capabilities; examine fish ecological relationships; establish watershed-specific boundaries for Riparian Habitat Conservation Areas and Riparian Management Objectives; and identify watershed restoration and monitoring objectives, strategies, and priorities.

a. Watershed Analysis shall be designed and carried out to meet the goals described on p. C-18 to C-19 of the PACFISH draft EA, in accordance with the following steps and timeframes:

(1) The FS and BLM shall provide to NMFS within 30 days of issuance of this biological opinion a list and description of watershed analyses currently underway in the Snake River Basin, and shall provide NMFS with copies of documentation for the resulting analyses when completed.

(2) During the period that PACFISH is in effect, the FS and BLM shall complete at a minimum four to five prototype watershed analyses within the Snake River Basin. These prototypes shall consider and use, where appropriate, the guidelines and procedural manuals being developed by the Interagency Watershed Analysis Coordination Team (WACT) and other relevant procedures, and be directed by the CRB Assessment Team. The FS and BLM shall coordinate with NMFS, through NMFS' representatives to the WACT and the CRB Assessment Team, regarding priorities and initial procedures for prototype watershed analyses, peer review and evaluation of results, and revision of procedures.

(3) Upon the completion of peer review and revision of watershed analysis procedures used in the prototype watershed analyses described in 3(a)(2) above, watershed analysis shall be carried out prior to planning and implementing new land management actions in Key Watersheds, as defined in 2(a) above. New actions shall be defined as those for which biological assessments have not been submitted to NMFS for section 7 consultations as of the date revision of watershed analysis procedures is completed.

(4) The environmental impact statements being prepared for ecosystem management in eastern Oregon/Washington and Idaho shall address the following:

(a) the role of watershed analysis in the long-term management of watersheds that contain critical habitat or that serve as potential sources of high quality water to critical habitat;

(b) identification and refinement of watershed analysis procedures to be used in the Snake River Basin; and

(c) schedules for conducting watershed analyses.

(5) The FS and BLM shall coordinate with NMFS, through NMFS' representatives to the WACT and the CRB Assessment and EIS teams, on identification of the role, procedures, and schedules for watershed analysis as it pertains to long-term ecosystem management in eastern Oregon/Washington and Idaho.

4. Identify interim Riparian Management Objectives (RMOs) that will guide land managers to protect and restore habitat conditions that are required by all life stages of listed salmonids.

a. Where existing data or watershed analysis indicate that watershed or stream reach habitat capabilities surpass the RMOs, the RMOs shall be adjusted on a reach or watershed basis to reflect the naturally attainable levels for the key and supporting features for that reach or watershed.

e. Proposed actions in watersheds containing designated critical habitat or in watersheds that serve as potential sources of high quality water to designated critical habitat (i.e. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam) that are likely to degrade habitat conditions in designated critical habitat that currently meet or surpass the minimum criteria set by

the interim RMOs shall not be executed. Ongoing actions in watersheds containing designated critical habitat or in watersheds that serve as potential sources of high quality water to critical habitat (i.e. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam) that are degrading or are likely to degrade habitat conditions that currently meet or surpass the minimum criteria set by the interim RMOs in critical habitat shall be modified or eliminated to prevent habitat degradation. Exceptions to this condition may be made only as a result of section 7 consultation with NMFS.

d. Proposed or ongoing actions that produce sediment increases that are likely to cause short or long-term adverse effects² to listed salmon or their designated critical habitat shall be modified or eliminated.

e. The FS and BLM shall develop a proposal to pursue withdrawal of RHCAs for new mineral entry in all watersheds with designated critical habitat. The proposal shall be submitted to NMFS for review within 3 months of the date PACFISH is implemented.

f. The FS and BLM shall provide guidance to land managers on how to decide whether "impacts (from mineral operations)... cannot be avoided" (MM-1), "no alternative to

² **Adverse effects are defined as follows (note differences with definition proposed by action agencies):**

Adverse effects to listed salmon include management-related, short or long-term, direct or indirect impacts of an individual or cumulative nature, such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproductive success, delayed or premature migration, or other adverse behavioral changes, to any individual or group of individuals of any listed anadromous salmonid fish species at any life stage. Adverse effects to critical habitat include effects to any of the essential features of critical habitat for Snake River salmon (described at 58 FR 68543) that would diminish the value of the habitat for the survival and recovery of listed salmon.

siting facilities in RHCAs exists" (MM-2) and "no alternative to locating mine waste... in RHCAs exists" (MM-3, as modified during consultation to delete the word "practicable).

g. The FS and BLM shall report to NMFS on progress made toward completion and implementation of Road Management Plans and Transportation Management Plans within 12 months of the implementation of PACFISH, and every 6 months thereafter until the plans are implemented for all National Forests and BLM Districts in watersheds with designated critical habitat and in watersheds that serve as potential sources of high quality water to designated critical habitat (i.e. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam).

h. Guideline RF-3b shall be amended to read as follows: "closing and stabilizing, or obliterating and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to listed anadromous fish and their designated critical habitat, and the ecological value of the riparian resources affected."

d. The FS and BLM shall jointly (preferably) or singly develop a comprehensive strategy that addresses fire suppression and fuels management (fire management BA) for all watersheds that contain designated critical habitat for Snake River salmon and for watersheds that may affect water quality in designated critical habitat (i.e. the Clearwater River Basin excluding the North Fork Clearwater River above Dworshak Dam). The fire strategy shall be submitted to NMFS for review no later than 135 days prior to the anticipated start of the 1995 fire season in the Snake River Basin.

5. Delineate interim Riparian Habitat Conservation Areas (RHCAs) that will protect and restore ecological structures, functions, and processes in riparian areas, maintain ecologically important linkages between upslope areas, riparian areas, and streams, and promote the survival and recovery of listed salmon.

a. All perennial stream reaches in designated critical habitat shall be included in the proposed RHCA for Category 1 - Fish-bearing streams.

b. Actions or groups of actions outside of RHCAs but that may affect RHCAs, due to their proximity to the RHCAs or other factors (such as areas where the 100-year floodplain is 300 feet wide or greater {600 feet including both sides of the stream channel}, or non-forested rangeland ecosystems with floodplains less than 100 feet wide) shall be specifically addressed by the FS and BLM in their biological assessments on specific actions or groups of actions submitted for section 7 consultation.

c. The interim RHCAs for non-forested rangeland ecosystems shall include the 100-year floodplain and adjacent riparian areas.

d. Interim RHCA widths as described under 5 (a-d) above shall apply until (1) Watershed Analysis {as described under 3 (a) above} is completed for the subject watershed; and (2) section 7 consultation with NMFS is completed for the subject action.

e. The FS and BLM shall use the Federal Wetlands Manual (U.S. Army Corps of Engineers et al. 1987) to identify and delineate riparian areas within RHCAs.

6. Monitor and report on the implementation of PACFISH interim direction.

a. The FS and BLM, in cooperation with NMFS, shall develop a quality control team to oversee the application of the "unacceptable risk" screens for ongoing actions. This team shall address the consistency of scientific and technical information used to make determinations using the screens, and shall develop inter-regional review methodologies.

b. The FS and BLM shall submit to NMFS a joint report within one year of the implementation of PACFISH, and yearly thereafter until termination of the PACFISH interim direction, to include the following sections:

(1) A section describing progress on the identification and designation of key watersheds.

(2) A section describing progress on the implementation of prototype watershed analyses, including a description of analysis status, a summary of peer review comments (with complete copies of peer review comments attached as an appendix), an evaluation of results for any completed analyses, and a description of planned revision of procedures.

(3) A section describing results of stream inventory and monitoring efforts, and relating those results to status of attainment of riparian management objectives, by watershed.

(4) A section describing progress on the identification of riparian management objectives that are specific to watersheds or ecoregions, by National Forest and BLM District.

(5) A summary of land management actions (e.g. timber harvest by acres, road miles constructed, reconstructed, and obliterated, recreation developments, mining activity, grazing activity, and watershed restoration) begun, carried out, or completed that are in, or modify, RHCAs, or that affect attainment of RMOs, by watershed.

c. The FS and BLM shall plan and carry out validation monitoring to determine the effectiveness of the proposed RHCAs and RMOs in protecting listed fish and their habitat.